****

NASA-15120 (June 2004)

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

NASA

Superseding NASA-15120 (October 2003)

****

SECTION TABLE OF CONTENTS

DIVISION 15 - MECHANICAL

SECTION 15120

PIPING SPECIALTIES

06/04

-- End of Section Table of Contents --

****

NASA-15120 (June 2004)

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

NASA

Superseding NASA-15120 (October 2003)

****

SECTION 15120

PIPING SPECIALTIES

06/04

****

NOTE: Delete, revise, or add to the text in this section to cover project requirements. Notes are for designer information and will not appear in the final project specification.

This section covers backflow preventers, backwater valves, water hammer arresters, wall hydrants, water filters, and water meters.

****

PART 1 GENERAL

1.1 REFERENCES

****

NOTE: The following references should not be manually edited except to add new references. References not used in the text will automatically be deleted from this section of the project specification.

****

The publications listed below form a part of this section to the extent referenced:

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C510	(1997) Double Check Valve Backflow-Prevention Assembly (Second Edition)
AWWA C511	(1997) Reduced Pressure Principle Backflow-Prevention Assembly (First Edition)
AWWA C700	(2002) Cold Water Meters - Displacement Type, Bronze Main Case
AWWA C701	(2002) Cold-Water Meters - Turbine Type for Customer Service

ASME INTERNATIONAL (ASME)

ASME A112.1.2	(1991; R 1998) Air Gaps in Plumbing Systems

PLUMBING AND DRAINAGE INSTITUTE (PDI)

PDI WH 201 (1988) Water Hammer Arrestors Standard

1.2 SUBMITTALS

****
NOTE: Review submittal description (SD) definitions in Section 01330 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project. Submittals should be kept to the minimum required for adequate quality control. Include a columnar list of appropriate products and tests beneath each submittal description.
****

The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES in sufficient detail to show full compliance with the specification:

SD-03 Product Data

Manufacturer's catalog data shall be submitted for the following items:

Backflow Prevention Devices
Backwater Valves
Water-Hammer Arresters
Wall Hydrants
Water Filters
Water Meters

SD-02 Shop Drawings

Installation drawings shall be submitted for the following items in accordance with paragraph entitled, "General Requirements," of this section.

Plumbing Specialties
Equipment

Detail Drawings shall be submitted in accordance with paragraph entitled, "General Requirements," of this section.

SD-07 Certificates

Certificates shall be submitted for the following items showing conformance with the referenced standards contained in this section.

Backflow Prevention Devices
Backwater Valves
Water-Hammer Arresters
Wall Hydrants
Water Filters
Water Meters

1.3 GENERAL REQUIREMENTS

****
NOTE: If Section 15003 GENERAL MECHANICAL PROVISIONS is not included in the project specification, applicable requirements therefrom should be inserted and the following paragraph deleted.
****

Section 15003 GENERAL MECHANICAL PROVISIONS applies to work specified in this section.

Detail Drawings shall be submitted for piping specialties consisting of fabrication and assembly drawings for all parts of the work in sufficient detail to enable the Government to check conformity with the requirements of the contract documents.

Installation drawings shall be submitted for Plumbing Specialties and Equipment in accordance with the manufacturer's recommended instructions and methods.

PART 2 PRODUCTS

2.1 BACKFLOW PREVENTION DEVICES (VACUUM BREAKERS)

****
NOTE: Delete paragraph title and following paragraphs when not applicable to the project.

Revise or delete paragraphs as required by project conditions.
****

Backflow prevention devices, including airgaps, shall conform to the requirements of ASME A112.1.2, AWWA C510 and AWWA C511.

Airgaps conforming to ASME A112.1.2 shall be constructed of metal, ferrous or nonferrous.

Devices 2-inch DN50 iron pipe size (ips) and smaller with moving components, including devices defined in AWWA C510 and AWWA C511, shall be constructed of nonferrous metals; nonmetal components of such devices shall be rated for the application service temperature.

Bodies for devices 2-1/2 inches DN65 and larger shall be corrosion-resistant ferrous material or bronze, with flanged connections. Metallic operating components and trim shall be nonferrous. Nonmetallic parts shall be rated for the application service temperature.

External surfaces of devices used in conjunction with equipment with polished or chrome-plated surfaces shall be similarly finished.

External surfaces of devices may be rough castings where these devices are used outside of the building or in equipment rooms.

Devices shall be protected from freezing and shall be installed and used in strict conformance with the manufacturer's instructions.

Devices mounted outside of the building shall be vandalproof.

****
NOTE: Select Type BAG for cooling-water drains, refrigerator drains, etc.
****

2.1.1 Type BAG

Type BAG backflow prevention device shall be an airgap casting of ferrous or nonferrous metal.

****
NOTE: Select Type BAT for lawn sprinklers, vats, open tanks, hose bibbs, wall hydrants, x-ray tanks, dishwashers (modified for high temperature 212 degree F) 100 degrees C), etc.
****

2.1.2 Type BAT

Type BAT backflow prevention device shall be an atmospheric type for nonpressurized service. Operating device, when installed where very low flow may occur, shall be sufficiently sensitive to preclude spillage and slow leakage of water into surrounding area. BAT device shall be used only where no backpressure may occur.

****
NOTE: Select Type "BPT" to separate nonpotable water lines, including sprinkler systems.
****

2.1.3 Type BPT

Type BPT backflow prevention device shall be a pressure type suitable for permanent duty under pressure but without possibility of exposure to backpressure. Operating device shall be spring-loaded. Unit shall consist of shutoffs upstream and downstream of vacuum breaker, one or two check valves, vacuum breaker, and test cocks.

****
NOTE: Select Type BDC unit to prevent connections through which nontoxic foreign material, such as steam, air, or other similar materials, may enter a potable line. Do not subject to backpressure or any device which may create a reversal of flow. Slight spillage may occur during testing.
****

2.1.4 Type BDC

Type BDC backflow prevention device shall be a double check-valve pressure unit with shutoffs upstream and downstream of the check valves, and test cocks in the upstream side of the upstream shutoff and on each side of the check-valve internal closing device. Check-valve loading, swing or lift, shall be such that the valve will remain closed against 1-pound per square inch (psi) 7 kilopascal differential pressure with the higher pressure on the inlet side of the check valve. Lift type shall be very soft elastomer.

****
NOTE: Select Type BRP for continuous-pressure service where backpressure may occur, provided it is not sewage or toxic substance.
****

2.1.5 Type BRP

Type BRP reduced-pressure backflow prevention device shall be a standard commercial unit or shall be fabricated from stock parts. A prototype of the device shall be submitted to, and approved by, a test and checkout laboratory. Before acceptance for installation, shop drawings and a certificate of performance test of the operational characteristics shall be submitted to the Contracting Officer. Device shall consist of two or more tight-closing check valves, two shutoff valves, reduced-pressure regulating device, and the necessary appurtenances for testing.

****
NOTE: Typical manufacturing sources include Beeco, CLA-VAL 3-inch DN80 ips.
****

2.2 BACKWATER VALVES

Backwater valves shall be inline type with automatically operating flapper valve and manually operated gate shutoff valve. Body and cover shall be cast iron; trim shall be bronze. Stem shall be nonrising with removable wheel.

Backwater valves at floor drains shall be automatic nonferrous or plastic ball type seating against elastomer seals.

2.3 WATER-HAMMER ARRESTERS

Water-hammer arresters shall be commercially manufactured products consisting of bellows arranged to absorb the energy of pressure waves generated by valve closure in a line in which water is flowing. Arresters shall be nonferrous construction, shall be rated as to capacity, and shall be certified in accordance with PDI WH 201.

2.4 WALL HYDRANTS

****
NOTE: Include "backflow preventers (vacuum breakers)" if the following paragraph is selected.
****

Wall hydrants shall have brass wall-boxes with nozzles and detachable T-handles and shall be provided with vandalproof type BAT vacuum breakers. Exterior surfaces shall be chrome-plated.

2.5 WATER FILTERS

****
NOTE: These filters are intended for photographic wash process to eliminate suspended matter only.

All piping downstream of filter shall be nonferrous and should be restricted to end-use unless costly

but longer lasting prefilters are installed.

Rewrite paragraph as required by project conditions.
****

Filter assembly shall be duplex with nonferrous 3-way ported ball valves on inlet and outlet sides for inservice filter selection. Metal parts that are wetted in service shall be brass, bronze or AISI Type 304 or 316 corrosion-resistant steel. Nonmetallic parts shall be ceramic, plastic, or fiber suitable for providing noncontaminating service with distilled or demineralized water. Filter shall be capable of retaining all particulate matter larger than 1 micrometer. Maximum pressure drop at maximum indicated flow rate with 50 percent dirty cartridge(s) shall not exceed 10 psi 70 kilopascal.

****
NOTE: Retain following paragraph only where through-the-wall filter operation is required.
****

Brass operating rod shall be provided within casings of zinc-coated steel pipe of sufficient length to extend through walls and as required to place valve inside the building.

2.6 WATER METERS

****
NOTE: Select disk water meters for greater accuracy than turbine type in sizes up to 300 gallons per minute 18.9 liter per second.

AWWA permissible pressure drop exceeds that specified by 5 psi 34 kilopascal.

Where a meter essentially discharges to atmosphere, as with a tank level float-control, the drawings must show a flow-limiting or balancing valve of the memory type upstream or downstream of the meter.

Check drawings for inclusion of memory type balancing valves.

Meters in sizes 3 inches 80 millimeter and larger shall be supported from the floor by suitable pedestal or otherwise.

This specification does not provide for compound-or fire-service water meters.
****

Positive displacement disk meters shall conform to AWWA C700, except as modified by requirements specified herein. Parts wetted by water shall be bronze, rubber, or plastic. Casing shall be flanged in sizes 2-1/2 inches 65 millimeter and larger. Registers shall be magnetic drive, straight reading. Maximum pressure drop at maximum capacity shall not exceed 10 psi 70 kilopascal for meters sized 1-1/2 inches 80 millimeter ips and smaller, 15 psi 100 kilopascal for meters 2 inches 50 millimeter ips and larger.

Turbine meters shall conform to AWWA C701, except as modified by

requirements specified herein. Casing shall be flanged. Register shall be magnetic drive, straight reading. Maximum pressure drop at maximum capacity shall not exceed 15 psi 100 kilopascal.

PART 3 EXECUTION

3.1 INSTALLATION

Equipment shall be installed as indicated and specified in accordance with manufacturer's recommendations.

3.2 WATER-HAMMER ARRESTERS

Water-hammer arresters shall be installed in accordance with the manufacturer's printed instructions and PDI WH 201.

-- End of Section --